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If you have any question about this product, call:
Sony Customer Infomation Center
East Coast: 201-930-7669 (SONY) NJ
Central: 708-250-7669 (SONY) IL
West Coast: 714-821-7669 (SONY) CA

or write to:
Sony Customer Infomation Center
Sony Drive, Mail Drop #T-11,
Park Ridge, NJ 07656

Sony Corporation Printed in Japan

SONY

3-756-445-21 (1)

Video Camera Recorder 8

CCD-FX520

AC Power Adaptor

AC-V25

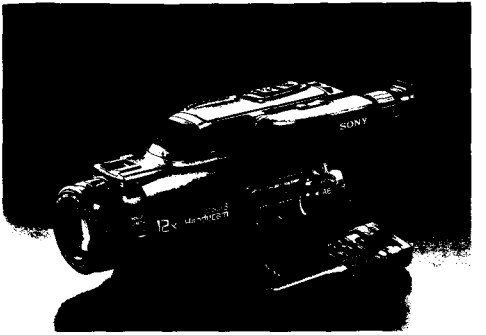
Operation Manual

Before operating the unit, please read this manual thoroughly and retain it for future reference.

Owner's Record

The model and serial numbers are located on the bottom of the camcorder and AC power adaptor. Record the serial numbers in the space provided on the right hand. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

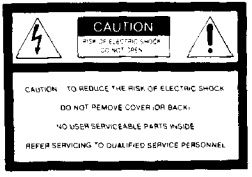
Model No. CCD-FX520
Serial No. _____
Model No. AC-V25
Serial No. _____



Video 8 Handycam

© 1993 by Sony Corporation

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Notice for the customers in Canada
This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

Caution

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio-TV technician for help.

About the AC-V25 AC Power Adaptor

For the customers in the U.S.A.

WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna.
Relocate the equipment with respect to the receiver.
Move the equipment away from the receiver.
Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

FOR THE CUSTOMERS IN USA AND CANADA

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

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Welcome to Video 8

Congratulations on your purchase of this Sony Handycam® Camcorder. With your Handycam, you can capture life's precious moments with superior picture and sound quality. Your Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

About This Manual

If you want to shoot as soon as possible, read the chapters "Getting Started" and "Basic Operations" first. As you read through this manual, buttons and settings on the camcorder are shown in capital letters. e.g. Set the POWER switch to CAMERA.

Note on TV Color System

TV color systems differ from country to country.
To view your recordings on a TV, you need an NTSC system based TV. When you want to use a PAL-M system based TV, you will need an NTSC-PAL-M transcoder (as this is an NTSC based camcorder). Please check the list on page 41 to see the TV color system of your country.

Note on the Supplied RFU Adaptor

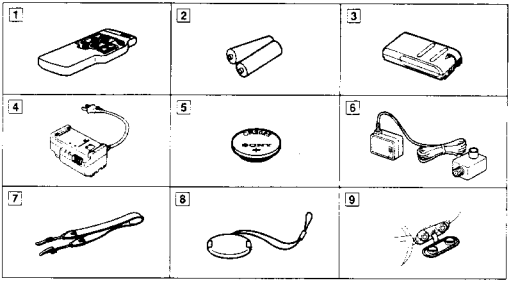
Since each country has its own electricity and TV color system, you may not be able to use the RFU adaptor when you use the camcorder abroad.

Precaution on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

Checking Supplied Accessories

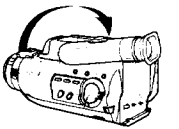
Check that the following accessories are supplied with your camcorder.



1. **Wireless Remote Commander (1) (p. 24)**
2. **Size AA (R6) Batteries for Remote Commander (2) (p. 24)**
3. **Battery Pack NP-55 (1) (p. 6)**
4. **AC Power adaptor AC-V25 (1) (p. 5)**
5. **Lithium Battery CR2025 (1) (p. 10)**
6. **RFU Adaptor RFU-90UC (1) (p. 22)**
7. **Shoulder Strap (1) (p. 46)**
8. **Lens Cap (1) (attached to the camcorder) (p. 17)**
9. **Jack Cover (1) (attached to the camcorder)**

After Taking the Camcorder out of the Box

Move the viewfinder barrel in the direction of the arrow.

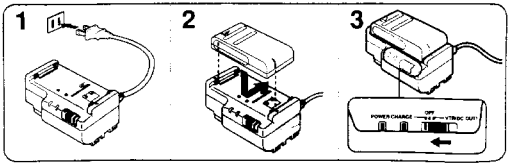


Charging and Installing the Battery Pack

Before using your camcorder, you need to charge and install the battery pack. The supplied battery pack is not charged when you purchase the camcorder. Use the supplied AC power adaptor for charging.

Charging the Battery Pack

(1)Connect the power cord of the AC power adaptor to a wall outlet. (2) Attach the flat side of the battery pack to AC power adaptor with aligning the lines on the AC power adaptor and battery pack. While pressing the lower part of the battery pack, slide the battery pack in the direction of the arrow until it clicks. (3) Set the VTR (DC OUT)/CHARGE selector to CHARGE. The POWER lamp and CHARGE lamp will light up. The charging will begin. When the battery is fully charged, the CHARGE lamp goes out. Set the VTR (DC OUT)/CHARGE selector to OFF. The POWER lamp goes out. Then disconnect the power cord from the wall outlet.



Removing the Battery Pack from the AC Power Adaptor

Slide the battery pack in the opposite direction of the arrow on the battery pack.

Charging time and battery life

Type of battery pack	NP-55 (supplied)	NP-77H NP-77HD	NP-77	NP-66H	NP-55H
Required charging time*	70	160	140	120	80
Battery life**	60	150	120	110	75

* Approximate minutes using AC-V25
** Approximate minutes, continuous recording when used indoor

Important!

Use the battery completely before charging!

Before you charge the battery, make sure it has been used (discharged) completely to avoid capacity down of the battery caused by excessive charging.

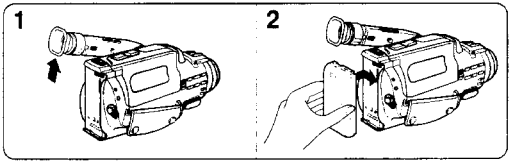
To use up the battery, remove the video cassette and simply slide the POWER switch of the camcorder to CAMERA with the battery attached, and leave the camcorder until the ⊏□ indicator appears flashing and a red lamp flashes in the viewfinder.

Notes on the AC power adaptor

- The camcorder cannot be operated while charging the battery pack.
- The POWER lamp will remain lit for a while even if the battery pack is detached and the power cord is disconnected after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the VTR(DC OUT)/CHARGE selector to OFF and disconnect the power cord. In about one minute, reconnect the power cord and set the VTR(DC OUT)/CHARGE selector to CHARGE again.

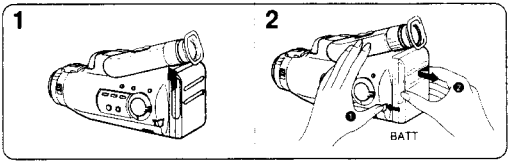
Installing the Battery Pack

(1) Lift up the viewfinder barrel. (2) Make sure you hold the battery pack properly. Align the right side of the battery pack with the white line on the camcorder. While pressing the lower part of the battery pack, slide it to the right until it clicks.



Detaching the Battery Pack

(1) Lift up the viewfinder barrel. (2) While pressing BATT in the direction of the arrow, slide out the battery pack to the left.



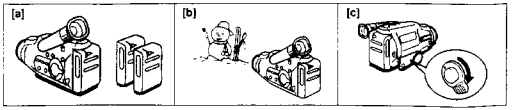
Tips for Using the Battery Pack

How to Prepare the Rechargable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording than you have planned. [a]
"Battery life" indicated in this manual is measured by the continuous recording time of the camcorder, placed at a room temperature using a full-charged battery.

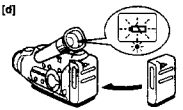
Battery life is shorter in a cold climate. [b]
Battery efficiency is decreased and the battery will be used up more quickly.

Turn STANDBY of the camcorder down when not recording to save battery power. [c]
A smooth transition between scenes can be made even if recording is stopped and started again.
While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically inside the camcorder and the battery is used. The battery is also used when a tape is inserted or ejected.



When the Rechargeable Battery Pack Should Be Replaced

When the ⌧ indicator and red lamp in the viewfinder change from slow blinking to rapid blinking while you are recording. [d]
Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth transition between scenes after the battery pack is replaced.



Notes on Charging

Before using the battery pack, charge it sufficiently. [e]
A brand new battery pack is not charged.

Make sure you use up the battery before recharging.
- If recording is completed before the ⌧ indicator appears in the viewfinder, it is recommended that you remove the tape, set the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the ⌧ indicator blinks rapidly.
- When you use the AC-S10 AC power adaptor, the DC-S10 car battery charger or BC-S10 portable battery charger, you can discharge the battery with their discharging function.
- Repeated charging without using up the battery may cause lowering of battery capacity. However, the original battery capacity can be recovered if you fully discharge (use up) and charge the battery again.

Recharge the battery pack after long storage.
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again but in this case the battery duration will be shorter than normal. After several charging and discharging cycles, the battery will recover its original capacity.

Keep the Terminals Clean [f]

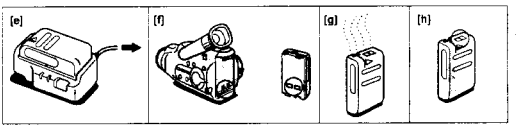
If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also, wipe the + and – terminals with a soft cloth or paper.

Notes on the Rechargeable Battery Pack

Why the battery pack heats up? [g]
During charging or recording, the battery pack heats up. This means energy has been generated and chemical change has occurred inside the battery pack, and this is not dangerous.

How to care for the battery pack
- Detach the battery pack from the camcorder after using it, and keep it in a cool place. When the battery pack is on the camcorder, a small amount of current flows to the camcorder even when it is turned off. This gradual discharge shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended that you charge the battery right before using.

How to use the switch on the battery pack [h]
This switch is provided so that you can remember the charging status. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.



How many times can the battery pack be recharged?
The battery pack can be fully charged and discharged about 500 times under normal temperatures. If the ⌧ indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Recommended temperatures during charging
The temperature range of charging is 5°C to 35°C (41°F to 95°F). However, to provide maximum battery efficiency, the recommended temperature range when charging is 10°C to 30°C (50°F to 86°F).

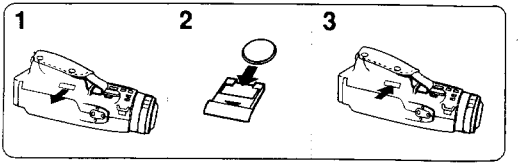
Be sure to observe the followings:
- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover.**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

Installing the Lithium Battery

The positive side of the lithium battery is marked +. Negative side has no polarity sign.

Installing the Lithium Battery

To activate the clock and store birth dates in the camcorder's memory, you must first install a lithium battery. Be sure to install the lithium battery with the correct polarity. (1) Remove the lithium battery holder located below the grip strap of the camcorder. (2) Install the supplied CR2025 lithium battery with the + side facing down. (3)Put the lithium battery holder into the camcorder.



Lithium Battery Life

The battery will last for approximately 1 year under normal conditions. When the lithium battery becomes weak, the & indicator will flash in the viewfinder screen for about 5 seconds when you turn STANDBY up while the POWER switch is set to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025. Use of any other battery may present a risk of fire or explosion.**

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, input data will be cleared and you will have to store the data again.

Warning

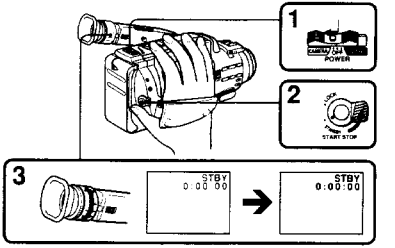
Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Caution

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

Adjusting the Viewfinder Lens

Before you use the camcorder for the first time, or after someone else has used it, focus the viewfinder lens. Make sure a power source is attached. (1) While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA. (2) Turn STANDBY up. (3) Turn the viewfinder adjustment ring so that the indicators in the viewfinder come into sharp focus.

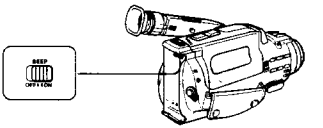


BEEP Feature

When you purchase the camcorder, BEEP is set to ON.
The camcorder will beep:

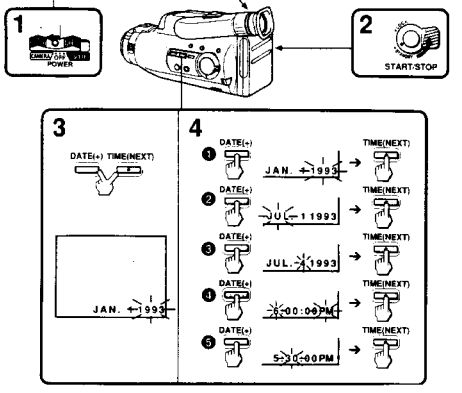
- Once when you start recording
- Twice when you stop recording
- Repeatedly when warning of unusual conditions (p. 50)

These beeps are not recorded on a tape. To deactivate the beep, detach the battery pack to reach the switch (p. 7) and set BEEP to OFF.



Setting the Date and Time

Before setting the clock, make sure a power source and lithium battery are installed and adjust the viewfinder lens (p. 11). The indicators appear in the viewfinder screen. (1) While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA. (2) Turn STANDBY up. (3) Press DATE (+) and TIME (NEXT) simultaneously for a few seconds until the year indicator flashes in the viewfinder. (4) Adjust the flashing digits for the year, month, day, hour and minute by using DATE (+) and TIME(NEXT). The clock starts from "00" second after you press TIME (NEXT) following the adjustment of the minutes. If you press TIME (NEXT) again, the time indicator will disappear.



To advance the digits the faster
Hold down DATE (+).

To correct the date and time setting
Repeat steps 3 to 4.

To check the preset date and time
Press DATE (+) to display the date indicator in the viewfinder. Press TIME (NEXT) to display the time indicator. When you press the same button again, the indicator goes out.

The year indicator changes as follows:

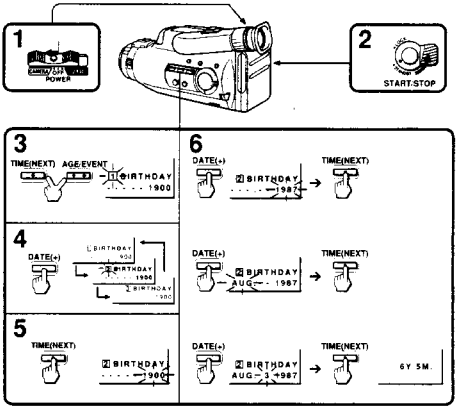
1993 → 1994 · · · → 2020

Note on the time indicator
The internal clock of the camcorder operates on a 12-hour cycle. 12:00:00 AM stands for midnight. 12:00:00 PM stands for noon.

Storing a Birth Date in Your Camcorder

By presetting your child's birth date in your camcorder, you can record your child's age in years and months on your tape. Once you enter the birth date of your child, the camcorder's clock will automatically update the age of your child. You can preset up to three birth dates or events in the camcorder's memory [1] to [3].

Before storing a birth date, make sure a power source and the lithium battery are installed, and the date setting is correct. The following procedure stores "Aug. 3 1987" in memory [2] as an example. (1) While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA. (2) Turn STANDBY up. (3) Press TIME (NEXT) and AGE/EVENT simultaneously for a few seconds until the "[1] BIRTHDAY - - -1900" indicator appears in the viewfinder. (4) Press DATE (+) to select [2]. (5) Press TIME (NEXT). The "1900" indicator flashes. (6) Enter the birth date by adjusting the flashing indicators for the year, month and day by using DATE (+) and TIME (NEXT).



Note on the birth or event dates indicators
Each time you press DATE (+), the display in the viewfinder changes from [1] BIRTHDAY to [2] BIRTHDAY, [3] EVENT and comes back to [1] BIRTHDAY.

To advance the digits faster
Hold down DATE (+).

Erasing the Age Indicator in the Viewfinder

Press AGE/EVENT repeatedly until no indicator appears.

Storing a Birth Date in Your Camcorder

If You Missed the Correct Number with DATE (+)

Keep pressing DATE (+). The indicator changes as follows:

Year: "1900" → "1901" - - - → Current year

↑ └ - -Current year minus 99 ←┘

Month: "JAN" → "FEB" - - - → "DEC" → "- - -"

↑ └──────────┘

Day: "1" → "2" - - - → "31"

↑ └──────┘

To Correct and Change the Setting

Follow the procedures from step 3 again.

To Preset the Year Before 1900

(1) After step 5 on page 13, keep pressing DATE (+) until the current year is displayed.
(2) Press DATE (+) again. The year goes back 99 years.
(3) Go to step 6 on page 13.

When in 2000

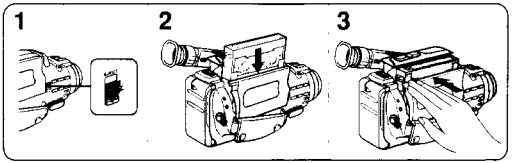
"- - - - - 1901" is displayed in step 3 on page 13. After that, it advances every year as "1902, 1903, ...".

To Cancel the Stored Birth Date

(1) Press AGE/EVENT and TIME (NEXT) simultaneously to make T BIRTHDAY appear in the viewfinder.
Press DATE (+) to select a birth date to cancel.
(2) Press TIME (NEXT) twice. The month indicator flashes.
(3) Press DATE (+) repeatedly until "- - - -" appears.
(4) Press TIME (NEXT).
The selected birth date is canceled from the memory and is not displayed when you press AGE/EVENT.

Inserting a Cassette

Make sure a power source is attached. (1) While pressing the small blue button on EJECT, slide EJECT down. The cassette holder automatically moves up and opens. (2) Insert a cassette (not supplied) with the window facing out. (3) Press the PUSH mark on the cassette holder until it clicks to close it. The cassette holder will automatically slide down.



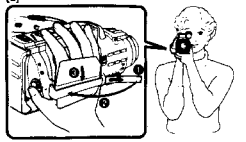
Ejecting the Cassette

While pressing the blue button on EJECT, slide EJECT down.

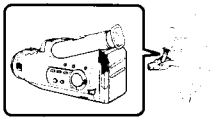
Hints for Better Shooting

For hand-held shots, you will get better result holding the camcorder according to the following suggestions:

[a]



[b]



- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb. **[a]**
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place the viewfinder eyecup firmly against your eye.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Turn the viewfinder up for recording from a low position (it can be turned up to 180 degrees.) **[b]**

Place the camcorder on a flat surface or use a tripod
Try placing the camcorder on a table or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder(p.44). Make sure the tripod screw is shorter than 6.5 mm (9/32 in).

Using the Viewfinder as a Sports Finder

What is a Sports Finder?

It is a function that enables you to monitor the picture while your eyes are at a distance from the eyecup. It is convenient when moving around to shoot scenes.

Setting the Viewfinder to the Sports Finder Position [c]

Turn the viewfinder adjustment ring clockwise completely.

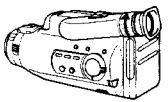
Returning to the Normal Viewfinder Position

Turn the adjustment ring counterclockwise until indicators that appear in the viewfinder come into sharp focus.

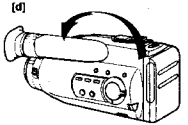
When Storing Your Camcorder [d]

Turn the viewfinder barrel to the front.

[c]



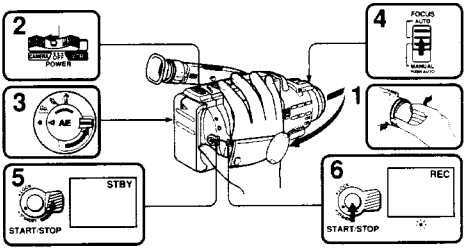
[d]



Basic Operation

Camera Recording

Make sure a power source is attached and a cassette is inserted. Before you record one-time events, you may want to make a trial recording to make sure you are using the camcorder correctly. (1) By pressing the releases on the lens cap, remove the lens cap and attach it to the grip belt. (2) While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA. (3) Set PROGRAM AE to the green position. (4) Set FOCUS to AUTO. (5) Turn STANDBY up. (6) Press START/STOP (red button). The camcorder starts recording and the "REC" indicator will appear in the viewfinder. The camera recording/battery lamp on the viewfinder barrel will also light.



To Stop Recording Momentarily

Press START/STOP again. The "STBY" indicator appears in the viewfinder (Standby mode).

To Finish Recording

Turn STANDBY down and slide the POWER switch to OFF. Eject the cassette (p. 15). To protect the lens, attach the lens cap to the lens by pressing the releases on the cap.

Note on Standby mode
If you leave the camcorder for more than 5 minutes with a cassette inserted in Standby mode, the camcorder goes off automatically. This is to prevent the battery from being expended unnecessarily and is to protect the tape from wearing out. To resume Standby mode, turn STANDBY down once and up again. To start recording, press START/STOP.

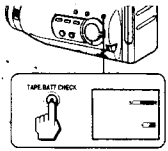
Note on recording
When you record from the beginning of the tape, run the tape for about 15 seconds before actual recording. This is to prevent the camcorder from missing any start-up scenes when you play back the cassette.
You can record in SP (standard play) mode only.

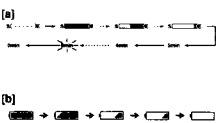
Note on the tape counter (p. 32)
The tape counter indicates the elapsed recording or playback time. Use it as a guide. There might be a discrepancy of several seconds from the actual time. To set the counter to zero, press COUNTER RESET under the viewfinder barrel.

See next page for further info.

To Check the Tape Remaining [a] or the Battery Capacity Remaining [b]

Press TAPE/BATT while recording, or in Stanby or VTR mode. The ▬▬ indicator appears above in the viewfinder. "S" means Start, "E" means End. The black bar indicates the tape remaining. While the ▪ ····· ▪ indicator appears the tape remaining is being calculated. The ▭◪ indicator appears below in the viewfinder. Black indicates battery capacity.





Notes on the tape remaining indicator

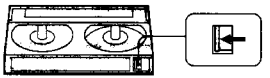
- The tape remaining indicator does not change while using EDITSEARCH, ▶▶ or ◀◀.
- The tape remaining indicator will also appear when you press TAPE/BATT CHECK in playback mode. In the playback mode, however, the indicator does not show the minutes remaining.

Notes on the battery capacity remaining indicator

- The battery capacity remaining indicator of the camcorder may indicate a different remaining capacity from that of the NP-77HD battery pack.
- Charge the battery pack when low-capacity is indicated. (p. 6)

To Prevent Accidental Erasure

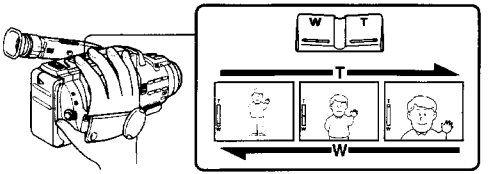
Slide the tab on the cassette to expose the red mark.



If you try to record with the red mark exposed, the ⌧ and ⏏ indicators flash in the viewfinder, and you cannot record on the tape. To re-record on this tape, slide the tab back out to cover the red mark.

Using the Zoom Feature

Zooming is a recording technique that enables you to change the size of the subject in the scene. You can also use the zoom to focus manually or to decide on a shooting angle before you start recording. For more professional-looking recordings, use the zoom sparingly.
T side: for telephoto (subject appears closer)
W side: for wide-angle (subject appears farther away)



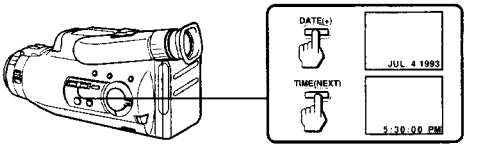
Zooming speed
Press the power zoom button firmly for high speed zooming. Press it softly for slow speed zooming.

When you shoot a subject using a telephoto zoom
If you cannot get a sharp focus while in extreme telephoto zoom, press the W side of the power zoom button until the focus is sharp. You can shoot a subject that is at least 1.2 m (about 47 1/4 inches) away from the lens surface in the telephoto position, or 1 cm (about 1/2 inches) in the wide-angle position.

Manual focusing in macro
You can also shoot with manual focus while doing close-ups. (p.26)

Recording the Date or Time

You can record the date or time displayed in the viewfinder with the scene while making a camera recording (p. 17). Make sure the date is set (p. 12). Set the POWER switch to CAMERA. Turn STANDBY up. Press DATE (+) or TIME (NEXT). The date or time indicator appears in the screen. You cannot record the date and time at the same time. Except for the date, time or age (p. 20) indicators, no indicators in the viewfinder are recorded.

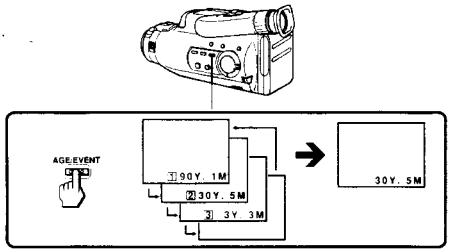


To Stop Recording the Date or Time

Press DATE (+) or TIME (NEXT) whichever the indicator is in the screen again. The camera recording does not stop if you cancel recording the date or time.

Recording the Age

You can record the age displayed in the viewfinder with the scene while making a camera recording (p. 17). Make sure the date is set (p. 12, 13). Set the POWER switch to CAMERA. Turn STANDBY up. Press AGE/EVENT to select the memory 1, 2, or 3. You can record the time elapsed since the date set, for example, your child's birthday. Except for the age, date or time (p. 19) indicators, no indicators are recorded.



Note on the age indicator
Each time you press AGE/EVENT, the indicator changes from 1 "The first age" to 2 "The second age", 3 "The third age" and back to no indicator. No-preset item will be skipped. The 1, 2, or 3 indicator goes out after one second.

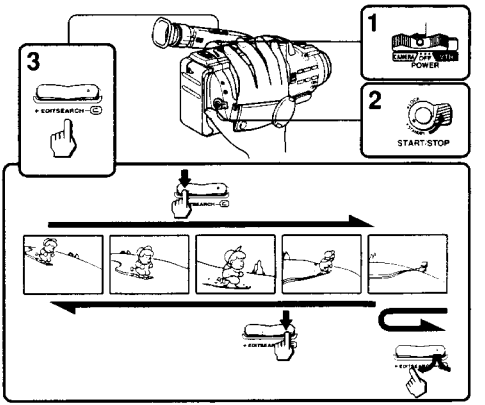
To Stop Recording the Age
Press AGE/EVENT repeatedly until the age indicator goes out.

To Select or Change an Age in the Memory to Record While Recording
Press AGE/EVENT repeatedly until the indicator you want to record appears. Recording of the indicator you select starts after 1, 2 or 3 indicator goes out.

When the camcorder is connected to a TV
The age indicator appears on the TV screen after the 1, 2 or 3 indicator goes out in the viewfinder screen. It appears even if the data-screen function controlled by the Remote Commander is off (p. 46).

Checking the Recorded Picture in the Viewfinder

Using EDITSEARCH, you can review the last recorded scene and check the recorded picture in the viewfinder. (1) While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA. (2) Turn STANDBY up. (3) Press the – side of EDITSEARCH momentarily. You can view the last few seconds of the recorded portion (**Rec Review**). Keep pressing EDITSEARCH. You can view the recorded portion (**Edit Search**). To stop playback, release EDITSEARCH.
+ side: to view the playback picture forward
– side: to view the playback picture in reverse



Note on using EDITSEARCH
When you use EDITSEARCH raising the viewfinder, hold the viewfinder with your thumb to prevent movement.

Monitoring the Sound While Viewing the Playback Picture in the Viewfinder
Connect an earphone (not supplied) to the 🎧 jack. Play back the tape in VTR mode (p. 23).

To Begin Re-recording
Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the tape, the transition between the last scene you recorded and the next scene you record will be smooth.

Connections for Playback

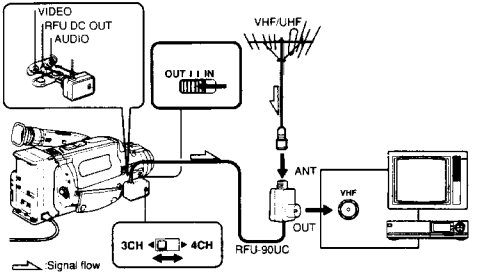
You can use this camcorder as a VCR by connecting it to your TV for playback. There are two ways to connect your camcorder.

- Connecting to a TV or VCR with video/audio input jacks
- Connecting to a TV or VCR without video/audio input jacks

We recommend you to use house current for indoor use of the camcorder (p. 25).

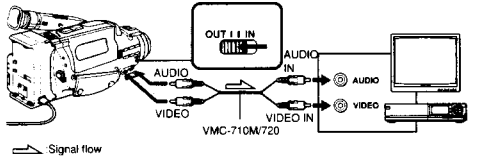
Connecting to a TV or VCR without Video/Audio Input Jacks

Connect the camcorder to the TV or VCR using the supplied RFU adaptor. Set IN/OUT to OUT (p. 43). Set the channel selector on the RFU adaptor and your TV channel to VHF channel CH 3 or CH 4, whichever is not active in your area.



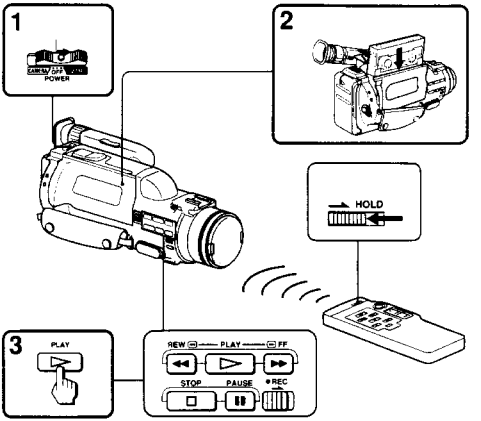
Connecting to a TV or VCR with Video/Audio Input Jacks

Connect the camcorder to your TV or VCR by using the appropriate AV connecting cable (not supplied).
If your TV or VCR is a monaural type, use the VMC-710M/720M AV connecting cable.
If your TV or VCR is a stereo type, use the VMC-910MS/920MS AV connecting cable. Or using the VMC-710M/720M AV connecting cable, connect its audio plug to the audio L jack of your TV or VCR.
Set IN/OUT on the camcorder to OUT (p. 43). Set the TV/VCR selector to VCR on the TV. When connecting the camcorder to a VCR, set the input selector on the VCR to LINE.



Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor it on a TV screen after connecting the camcorder to a TV/VCR (p. 22). You can use the Remote Commander to remotely operate the camcorder (p. 24). If HOLD on the Remote Commander is set to the right, slide it in the opposite direction (p. 46).
(1) While pressing the small green button on the POWER switch, set the POWER switch to VTR. (2) Insert a recorded cassette with the window facing out (p. 15). (3) Press ▷. Playback starts.



To stop playback, press □.
To rewind the tape, press ◀◀.
To advance the tape rapidly, press ▶▶.

Note on the recording/playback modes
You can record a tape in SP (standard play) mode only. You can play back a tape in both SP and LP (long play) modes.
The LP indicator appears in the viewfinder when you play back a tape recorded in LP mode. There is no SP/LP indicator in SP playback mode.

See next page for further info.

To View a Still Picture (Playback Pause)
Press ❚❚ during playback. To resume playback, press ❚❚ or ▷.

To Locate a Scene (Picture Search)
Keep pressing ◀◀ or ▶▶ during playback. To resume normal playback, release the button.

To Monitor the High-speed Picture During Fast-forward or Rewind (Skip Scan)
Keep pressing ◀◀ while rewinding, or ▶▶ while advancing the tape. To resume normal playback, press ▷.

To View the Picture in a Sequence of Stop-motion Images
Press EDITSEARCH repeatedly in playback pause mode. If you keep pressing EDITSEARCH, you can view the playback picture forward (+) or in reverse (–).

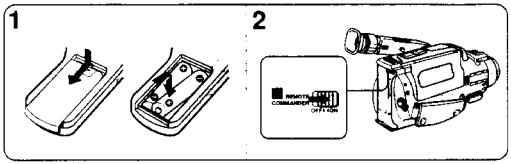
To View the Picture at 1/5 Speed (Slow Playback) (Only With the Commander)
Press ❚▶ of the Remote Commander (p.46) during playback. To resume normal playback, press ▷. When slow playback lasts for about 1 minute, it shifts to the normal playback speed automatically.

Notes on playback
- Streaks may appear and the sound may be muted depending on playback mode.
- When still picture mode lasts for about 5 minutes, the camcorder automatically stops.

To display the viewfinder screen indicators on a TV
Press DATA SCREEN on the Remote Commander.
To erase the indicators, press DATA SCREEN again.

Preparing the Remote Commander

To use the supplied Remote Commander for playback and camera recording, do the followings: (1) Insert supplied two size AA (R6) batteries with correct polarity. (2) Set ■ REMOTE COMMANDER on the battery mounting surface of the camcorder to ON.



Notes on the Remote Commander
- Keep the remote sensor away from strong light such as direct sunlight or illumination. Remote control with the Remote Commander may not be effective.
- Command mode of the Remote Commander is VTR2. Avoid using the Sony VCRs with the same command mode at the same time.

Using Alternative Power Sources

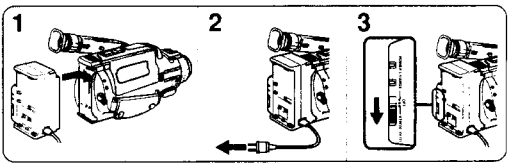
You can choose any of the following power sources for your camcorder: Battery pack (P.6), house current, and 12/24 V car battery.
The appropriate power source for you to choose depends on where you want to use your camcorder.

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-55 (supplied), NP-77H/77HD, NP-77, NP-66H or NP-55H
Indoors	House current	AC power adaptor AC-V25 (supplied), AC-V30 or AC-S10
In the car	12 V or 24 V car battery	DC pack DCP-77

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If this happens, supply the power again immediately.

Using House Current

Use the supplied AC-V25 AC Power Adaptor. (1) Align the right side of the AC power adaptor with the white line on the camcorder. While pressing the lower part of the AC power adaptor, slide it to the right until it clicks. (2) Connect the power cord of the AC power adaptor to a wall outlet. (3) Set the VTR (DC OUT)/CHARGE selector on the AC power adaptor to VTR (DC OUT).



To detach the AC power adaptor
Detach it in the same way you do it with the battery pack. (p. 7)

Notes on the AC power adaptor
- Before attaching the AC power adaptor to the camcorder, detach the battery pack from the AC power adaptor.
- The camcorder does not operate unless the VTR (DC OUT)/CHARGE selector is changed to VTR (DC OUT).
- The POWER lamp will remain lit for a while even if the battery pack is detached and the power cord is disconnected after charging the battery. This is normal.
- If the power lamp does not light, set the VTR (DC OUT)/CHARGE selector to OFF and disconnect the power cord. In about one minute, reconnect the power cord and set the VTR (DC OUT)/CHARGE selector to VTR (DC OUT) again.

Using a Car Battery

When you want to use a car battery as a power source for your camcorder, use the DCP-77 DC Pack (not supplied). By attaching the DCP-77 DC Pack to your camcorder and connecting the power cord of the DC pack to the cigarette lighter socket of a car (12 V or 24 V), the car battery supplies power to your camcorder.

To detach the DC pack from the camcorder
Detach it the same way you do the battery pack. (P. 7)

Options for Charging the Battery

AC-S10 AC Power Adaptor
Completely discharge a battery pack before recharging it to its full capacity.

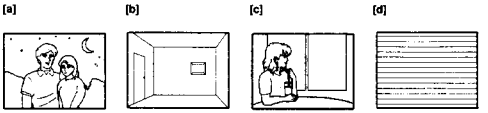
BC-77, BC-S10 Portable Battery Charger
Charge a battery pack on 100 – 240 V AC. BC-S10 has a discharging function.

DC-S10 Car Battery Charger
Charge a battery pack through the cigarette lighter socket. It has a discharging function.

Focusing Manually

When to Use Manual Focus

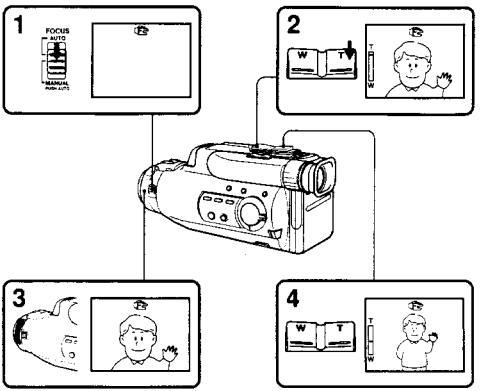
Use manual focus under the following conditions:



- Insufficient light **[a]**
- Subjects with little contrast - walls, sky, etc. **[b]**
- Too much brightness behind the subject **[c]**
- Horizontal stripes **[d]**
- Subjects through frosted glass
- Subjects beyond nets, etc.
- Bright subject or subject reflecting light
- Shooting a stationary subject when using a tripod

Focusing Manually

When focusing manually, first focus in telephoto before recording (p. 19), and then reset the shot length. (1) Set FOCUS to MANUAL. The indicator appears in the viewfinder. (2) Keep pressing the T side (telephoto) of the power zoom button until the zooming stops. (3) Turn the focus ring to achieve sharp focus. (4) Set the desired shot length using the power zoom button.



To Shoot with Autofocus Momentarily

When you want to switch to autofocus momentarily while recording in manual focus mode, push FOCUS down to PUSH AUTO. Autofocus functions while FOCUS is held down. When it is released, manual focus mode will be resumed.

To Return to Autofocus Mode

Set FOCUS to AUTO. The indicator in the viewfinder disappears.

To shoot in relatively dark places
Shoot at wide angles after focusing in telephoto.

Note on the focus ring
The focus ring does not have a stop position.

Using the PROGRAM AE Function

You can select the suitable mode among three PROGRAM AE (Auto Exposure) modes depending on the shooting situation. When you use PROGRAM AE, you can get a Portrait effect (the subject is in focus and the background is out of focus) or capture high-speed action with Sports mode or High-Speed Shutter mode.

Selecting the Best Mode

Select the best mode by referring to the examples below.

[a]

[b]

[c]

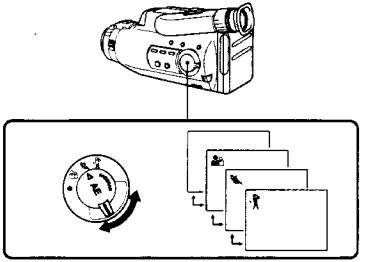
Portrait mode [a]
- A still subject such as a person or flower
- Subject behind an obstacle such as a net
- Zooming in on a subject in telephoto

Sports mode [b]
- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape in a moving car

High-speed Shutter mode [c]
- A golf swing or a tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in clear, sharp picture

Using the PROGRAM AE Function

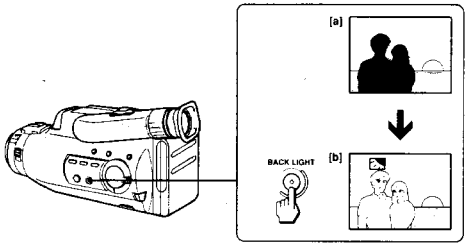
Set PROGRAM AE to the desired mode , or . One of these marks appears in the viewfinder corresponding to the switch position.



Note on shutter speed
The shutter speed in each PROGRAM AE mode is as follows:
Portrait mode : between 1/60 and 1/2000
Sports mode : between 1/60 and 1/500
High-speed Shutter mode : 1/4000

Compensating for Backlighting

When shooting a subject that is rather dark because the light source is behind the subject [a], you can compensate for the brightness of the background [b]. Press BACK LIGHT. The ⧈ indicator appears in the viewfinder.



[a] Subject is too dark because of backlight.
[b] Subject becomes bright with backlight compensation.

After shooting
Be sure to release this adjustment condition by pressing BACK LIGHT again. The ⧈ indicator goes out in the viewfinder. Otherwise, the picture will be too bright under normal lighting condition.

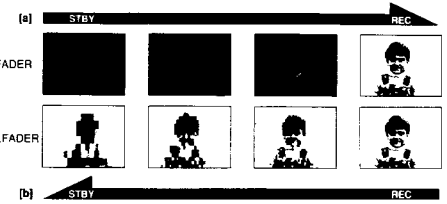
This function is also effective under following conditions:
- On the snow e.g. at the ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber against a white background, his or her face tends to become dark if you do not use this function.

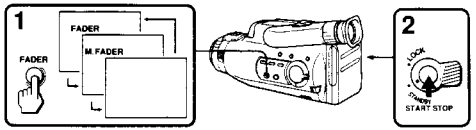
Fade-in and Fade-out

You can fade in or fade out to give your recording a professional appearance. When fading in, the picture will gradually appear from black or mosaic. The sound will also gradually increase. When fading out, the picture will gradually fade out into black or mosaic. The sound will also decrease.

When Fading in [a]
(1) While the camcorder is in the Standby mode, press FADER. The FADER indicator starts flashing.
(2) Press START/STOP. The FADER indicator stops flashing and recording and fade-in start.

When Fading out [b]
(1) During recording, press FADER. The FADER indicator starts flashing. (2) Press START/STOP to stop recording. The FADER indicator stops flashing, the picture fades out and recording stops.





Cancelling the Fade-in/out Function
Before pressing START/STOP, press FADER again once or twice until neither the FADER nor the M. FADER indicator appears in the viewfinder.

When the date/time or age indicator is displayed
The date/time or age does not fade in nor fade out.

Using the Tape Counter

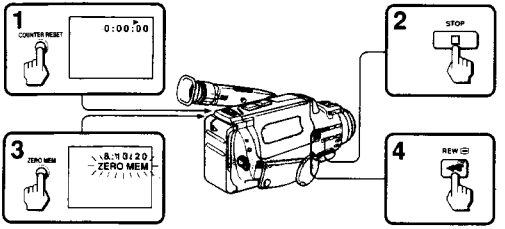
During recording or playback, the digits on the tape counter indicate the elapsed recording or playback time.

Referring to the Amount of Elapsed Time and a Particular Point

Press COUNTER RESET at the beginning of the tape. The counter in the viewfinder displays "0:00:00". The counter shows the elapsed time so that you can refer to the amount of elapsed time. You can also use the counter as an index to find a particular point.

Returning to a Pre-registered Position

You can easily go back to the desired point on a tape after playback.
(1) During playback, press COUNTER RESET at the point you later want to locate. The counter shows "0:00:00" in the viewfinder. (2) Press □ when you want to stop playback. (3) Press ZERO MEM to stop rewinding at the counter's zero point. The "ZERO MEM" indicator flashes in the viewfinder. (4) Press ◀◀. The tape stops automatically when the counter reaches approximately zero.



Notes on the tape counter

- Something must be recorded on the tape in order for the tape counter to function. Tape counter does not work on a blank tape.
- There may be a discrepancy of several seconds from the actual time.

Notes on ZERO MEM

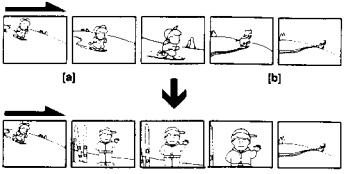
- When you press ZERO MEM, the counter's zero point is memorized.
- This function is cancelled automatically once the tape is rewound or sent forward to the point you pre-registered.
- Be sure to press ZERO MEM after stopping the tape. It does not function during recording or playing back.

Using this function in reverse.

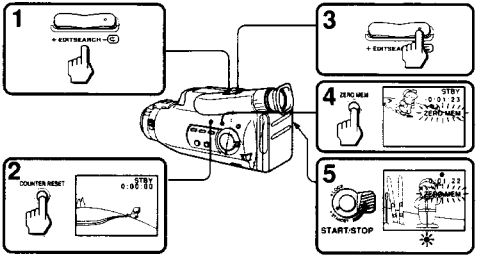
You can return to a desired position after rewinding with this function. Press COUNTER RESET at the point you want to return to later. Press ◀◀. Press □ when you want to stop rewinding. Press ZERO MEM. Press ▶▶. The tape automatically stops near the zero point you first set.

Inserting a Scene in the Middle of a Recorded Tape

You can insert a scene in the middle of a recorded tape by setting the starting point and ending point. A previously recorded portion will be erased.



(1) While looking in the viewfinder in the Standby mode, keep pressing the + or – side of EDITSEARCH and release the button where you want to end the insertion [b]. (2) Press COUNTER RESET to set the counter to zero. (3) While looking in the viewfinder, keep pressing the – side of EDITSEARCH and release the button where you want to start the insertion [a]. (4) Press ZERO MEM to stop recording of insert at the counter's zero point. (5) Press START/STOP. Insert recording begins. The insert recording stops automatically at the counter zero point.



Canceling the ZERO MEM

Press ZERO MEM. The ZERO MEM indicator disappears.

Note on the recorded picture

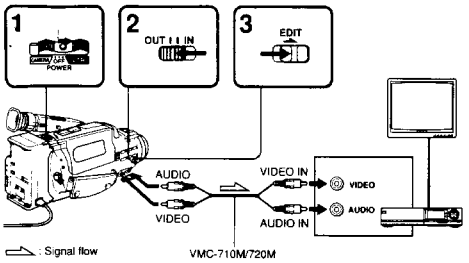
The picture may be distorted at the ending point when played back.

Editing onto Another Tape

You can create your own video programme by editing with any other 8 mm, Hi8, Betamax, VHS, S-VHS, VHSC, or S-VHSC VCR that has video/audio inputs.

Before Editing

After connecting the camcorder to your VCR with an appropriate AV connecting cable (not supplied), (1) Set the POWER switch to VTR. (2) Set IN/OUT to OUT. (3) Slide EDIT in the direction of the arrow.



To Start Editing

(1) Insert a blank tape (or a tape you want to re-record) into the recording VCR. Then insert your recorded tape into the camcorder. (2) Play back the recorded tape on the camcorder until you locate the point where you want to start editing. Then set the camcorder to playback pause mode. (3) Set the recording VCR to recording pause mode. (4) Press II on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes

Repeat steps 2 to 4.

To Stop Editing

Press □ on the camcorder and VCR.

Use of the EDITSEARCH button

To play back a tape in the forward or reverse direction, keep pressing EDITSEARCH during playback pause. You can play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Note on the Data Screen function

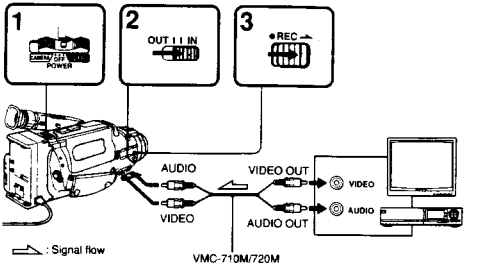
If you have displayed the viewfinder screen indicators on the TV (Data Screen function), erase the indicators by pressing DATA SCREEN on the Remote Commander so that they will not be recorded on the tape. (p. 46)

Notes on EDIT

- It functions when using the camcorder as a VCR for playback.
- By using EDIT, you can keep picture and sound deterioration resulting from recording to a minimum.
- Avoid using re-recorded tapes.

Recording from a TV or VCR

You can record a tape from another VCR or a TV that has audio/video outputs. Connect the camcorder to the TV or VCR. (1) Set the POWER switch to VTR. (2) Set IN/OUT to IN. (3) Slide ● when you want to start recording.



To Check the Picture from a TV or VCR before Recording

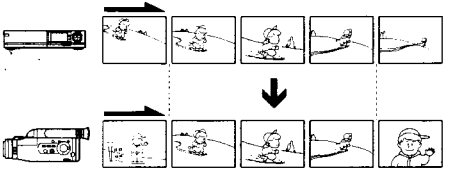
Slide ●, and then press II to check the picture in the viewfinder. If you do not press II immediately after sliding ●, recording will start.

To Stop Recording

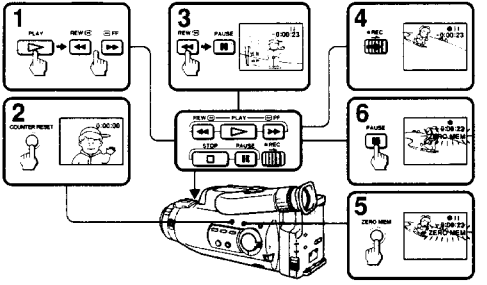
Press □.

To Replace Recording on a Tape (Insert Editing)

You can insert a scene from a tape on a VCR into your originally recorded tape by setting the starting point and ending point.



Before starting insert editing, **set your VCR to the playback pause mode at the beginning of the scene to be recorded.** (1) On your camcorder, locate the point where the insert should end by pressing ◀◀ or ▶▶ after pressing playback **[b]**. (2) At the end point, press COUNTER RESET to set the counter to zero. (3) Locate the point where you want to start the insertion by pressing ◀◀ and press **II** to pause **[a]**. (4) Slide ● to set the camcorder into recording pause mode. The picture in the viewfinder screen switches to the VCR tape. (5) Press ZERO MEM to stop recording at the counter's zero point. (6) Press **II** on the camcorder and the VCR to start insert editing. You can monitor the picture being inserted in the viewfinder screen. The insert recording will stop automatically near the zero point on the camcorder's counter.



To Change the End Point

Press ZERO MEM so that the ZERO MEM indicator disappears, and begin again from step 1.

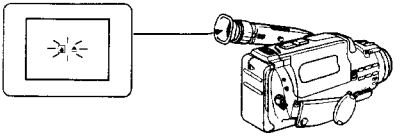
Maintenance Information and Precautions

Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. If this happens, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensor. However, take the following precautions.

Inside the Camcorder

When the ⊟ and ≙ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, none of the functions except cassette ejection will work.
Eject the tape, turn off the camcorder, and leave it with the cassette compartment open for about 1 hour.
If the ⊟ indicator does not light up when you turn on the power, you can use the camcorder again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert tape and press a tape transport button, the ≙ indicator flashes in the viewfinder. If this happens, none of the function except cassette ejection will work.
Eject the tape and let it sit for about 1 hour.
If the ≙ indicator does not light up when you insert the tape and press a tape transport button, you can use the camcorder again.

On the Lens

No indicator will appear, but the picture becomes dim. Turn off the power and do not use the camcorder for about 1 hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
(1) Be sure to tightly seal the plastic bag containing the camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

To ensure clear pictures, clean the video heads periodically. When playback pictures are "noisy", or hardly visible, the video heads may be contaminated.

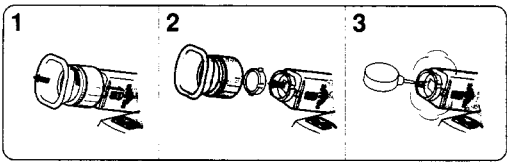
[a] Slight contamination
[b] Critical contamination
If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

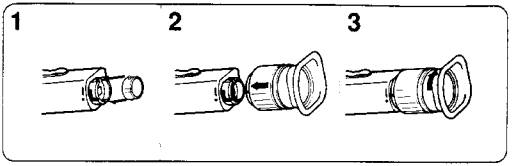
Removing Dust from Inside the Viewfinder

(1) While holding down the switch on the viewfinder barrel, turn the eyecup in the direction of the arrow and pull it up to detach it. (2) Remove the small lens from inside of the viewfinder. (3) Clean the surface of the screen with a commercially available blower.



To Reattach the Eyecup

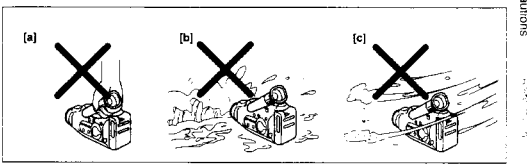
(1) Replace the small lens inside the viewfinder. (2) Align the groove on the eyecup with the • mark on the barrel. (3) Turn the eyecup clockwise.



Precautions

Camcorder Operation

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, disconnect the plug of the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder.**[a]**
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired.[b]**
- **Do not let the camcorder get wet. Keep the camcorder from rain or sea water. It may cause a malfunction and sometimes the malfunction cannot be repaired.[c]**



Maintenance Information and Precautions

Camcorder Care

- Never leave the camcorder under temperatures above 60°C (140°F), such as in a car parked in the sun or under direct sunlight.
- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and VTR sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Handling Tapes

- Do not insert anything into the small holes on the rear of the cassette. These holes are used to sense the type, thickness of the tape, or if the tab is out or in.

AC Power Adaptor Care

Charging

- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery on a flat place without vibration.
- The battery will get hot during charging. But it is normal.
- Do not continuously recharge a charged battery pack as that will cause the battery pack efficiency to deteriorate.

Charging temperature

The temperature range for charging is 5°C to 35°C (41°F to 95°F). However, to prevent maximum battery efficiency, the recommended temperature range is 10°C to 30°C (50°F to 86°F).

Others

- The model for USA or Canada: One blade of the plug is wider than the other for the purpose of safety and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Disconnect the plug of the unit from the wall outlet when not in use for a long time. To disconnect the AC power cord, pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if it has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting surface. If it does, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from any AM receivers and video equipment because it will disturb AM reception and video operation.
- Do not place the unit in locations where it is:
  - —Extremely hot or cold
  - —Dusty or dirty
  - —Very humid
  - —Vibrating
- If any difficulty should arise, disconnect the plug of the unit and contact the nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electricity and TV color systems. Before using your camcorder abroad, check the following points:

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz. If you cannot attach the power adaptor to the wall outlet, use the commercially available AC plug adaptor [a], depending on the design of the wall outlet [b].

Difference in Color Systems

This camcorder is an NTSC system-based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system-based TV. When you want to use a PAL-M system-based TV, you will need an NTSC/PAL-M transcoder (as this is an NTSC based camcorder). For TV system information check the following alphabetical list.

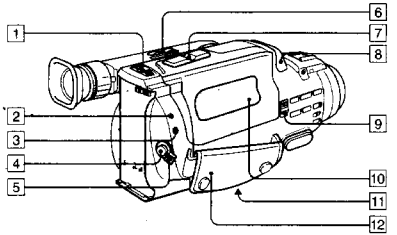
NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

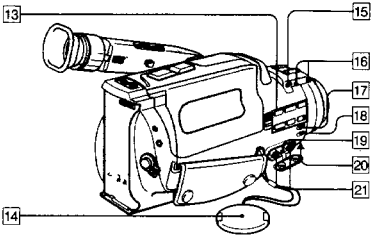
PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL M system countries
Brazil

PAL N system countries
Argentina, Paraguay, Uruguay

SECAM system countries
Bulgaria, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.





1 **POWER switch (p. 11)**
CAMERA: for camera recording
VTR: for playing back or editing tape
OFF: power off

2 **REMOTE (LANC) control jack**
Connect the LANC connecting cable of a wired remote control unit such as an editing controller. In this case, set the REMOTE COMMANDER switch to OFF. (p. 24)
(LANC) stands for Local Application Control Bus System. The control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the connectors indicated as CONTROL L or REMOTE.

3 **(earphone) jack (minijack) (p. 21)**
Connect an earphone (not supplied) to monitor the sound while viewing the playback or the recording picture.

4 **START/STOP button (p. 17)**
To start recording, press it after setting the POWER switch to CAMERA and turning STANDBY up.
To stop recording momentarily, press it again.

5 **STANDBY switch (p. 11)**
To set the camcorder to Standby mode (recording standby mode), set it up. To stop recording or to prevent from accidentally recording and wearing down the battery, set it down.

6 **EDITSEARCH (and recording review) button (p. 21)**
Press it to check the recorded scene in the viewfinder in Standby mode.
+ side: to view the playback picture forward
– side: to view the playback picture in reverse

7 **Power zoom button (p. 19)**
Press it to change the size of the subject in the scene.
T side: for telephoto (subject appears closer)
W side: for wide-angle (subject appears further away)

8 **Built-in microphone**

9 **EJECT (cassette eject) button (p. 15)**
While pressing the blue button, slide it to insert or eject a cassette.

10 **Cassette holder (p. 15)**

11 **Lithium battery holder (p. 10)**
Insert a lithium battery here to activate the clock.

12 **Grip strap (p. 16)**
Put your hand thorugh the grip strap to hold the camcorder. Adjust the length of the strap so that your thumb can easily touch START/STOP.

13 **Tape transport buttons (p. 23)**
□ STOP
◀◀ REW (rewind)
▷ PLAY (playback)
▶▶ FF (fast forward)
II PAUSE
● REC (recording)
These buttons will function in VTR mode.

14 **Lens cap (p. 17)**
Attach it to the lens when not using the camera. Put it on the grip strap while camera recording.

15 **MIC jack (p. 44)**
Connect an optional external microphone (monaural). This jack also accepts a "plug-in-power" microphone. If the microphone has two plugs, connect the DC IN plug to the RFU DC OUT jack on the camcorder.

16 **Remote control sensor (p. 46)**
Aim the Remote Commander here for remote control.

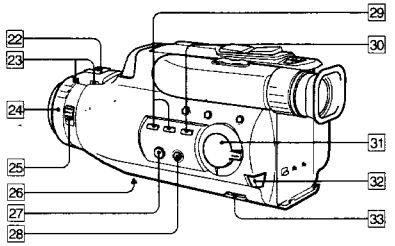
17 **EDIT switch (p. 34)**
Set it in the direction of the arrow when editing onto another tape.

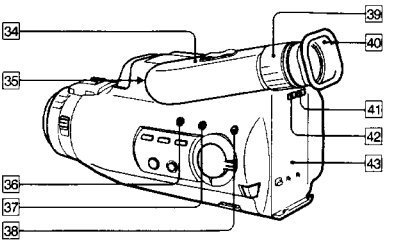
18 **OUT/IN (video and audio input/output) selector (p. 22, 34, 35)**
Set it to OUT when playing back the tape. Set it to IN when recording or editing from a TV or another VCR.

19 **RFU DC OUT (RFU adaptor DC output) jack (p. 22)**
To view the recorded picture on the TV that has only an antenna input, connect the RFU adaptor here.

20 **Hook for shoulder strap (p. 46)**

21 **VIDEO/AUDIO jacks (p. 22)**
These jacks work as both input and output jacks by switching the IN/OUT selector on the camcorder. To view the recorded picture on the TV or to record onto another tape, connect these jacks and the VIDEO/AUDIO input jacks on the TV or VCR using an A/V connecting cable (not supplied). To record from a TV or a VCR, connect these jacks and the VIDEO/AUDIO output jacks on the TV or VCR.





22 **Accessory shoe (p. 43)**
Attach the external microphone (not supplied) here.

23 **Remote control sensor (p. 46)**
Aim the Remote Commander here for remote control.

24 **Focus ring (p. 27)**
Turn it to adjust the focus manually and to achieve a sharp focus in manual focus mode.

25 **FOCUS switch (p. 27)**
AUTO: for autofocusing
MANUAL: for manual focusing
PUSH AUTO: for temporary autofocusing while in manual focusing mode

26 **Tripod receptacle (bottom) (p. 16)**
Attach a tripod (not supplied) here. When attaching a non-Sony tripod, make sure that the length of the camera mounting screw is shorter than 6.5 mm (9/32 inches). Otherwise, the screw might damage the inner part of the camcorder.

27 **FADER button (p. 31)**
When starting a recording by fading in, press the button and then start recording. When you conclude a recording by fading out, press the button and then press START/STOP to stop recording.
You can select black fader by pressing FADER once or mosaic fader by pressing it twice.

28 **BACK LIGHT button (p. 30)**
Press it when a recording subject is too dark because of excessively bright background.

29 **DATE(+) and TIME(NEXT) buttons (p. 12, 19)**
Each button has two functions. One is to display the date or time indicator in the viewfinder. The other is to set the date and time. Pressing DATE (+) advances digits and pressing TIME (NEXT) sets the next element while setting date and time.

30 **AGE/EVENT button (p. 13, 20)**
Press when setting the birth date (or event) indicator, or when displaying and turning off the age indicator in the viewfinder.

31 **PROGRAM AE selector (p. 28)**
Set the desired PROGRAM AE mode (Portrait/Sports/High-Speed Shutter mode) to fit the shooting situation.

32 **BATT (battery eject) knob (p. 7)**
Keep pressing to remove the battery pack.

33 **Hook for shoulder strap (p. 46)**

34 **Viewfinder (p. 11, 16)**
You can monitor the monochrome picture being recorded or played back. For details on the indicators in the viewfinder, see page 51.

35 **Camera recording/battery lamp (p. 17, 50)**
This red lamp lights up while camera recording, when it flashes, the battery is almost empty or the tape is near its end.

36 **COUNTER RESET button (p. 17, 32, 33, 36)**
Press to reset the tape counter to zero.

37 **ZERO MEM button (p. 32, 33, 36)**
Press to memorize the zero point of the tape counter, that is, to stop the tape at the counter's zero point. Press it while the tape transport is stopped or paused.

38 **TAPE/BATT CHECK button (p. 16)**
Press to display the tape remaining indicator or battery remaining indicator in the viewfinder.

39 **Viewfinder adjustment ring (p. 11)**
To focus the viewfinder lens, turn this ring until the indicator in the viewfinder comes into sharp focus. To set to the sports finder position, turn the ring clockwise completely.

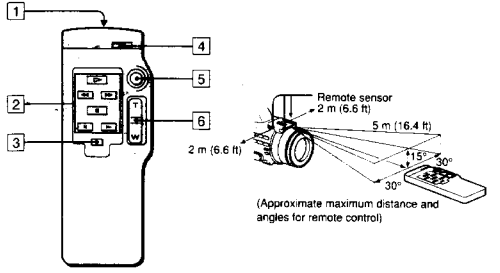
40 **Eyecup**
When looking in the viewfinder with glasses, bend back the eyecup.

41 **BEEP switch (p. 11)**
Set to ON to beep when starting and stopping camera recording or when unusual conditions occur. To deactivate the beep, set it to OFF.

42 **■ REMOTE COMMANDER switch (p. 24)**
Set to ON to use the supplied Remote Commander. When you connect a wired remote control unit to the camcorder, set it OFF.

43 **Battery mounting surface**

Wireless Remote Commander



(Approximate maximum distance and angles for remote control)

1 **Transmitter**
Point toward the remote sensor on the camcorder to remotely control the camcorder. Activate the camcorder before you use the Remote Commander.

2 **Tape transport buttons (P. 23)**

3 **DATA SCREEN BUTTON**
Press to display the viewfinder screen indicators on a TV when you connect the camcorder to a TV. To erase the indicators, press it again.

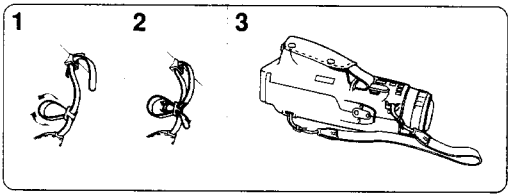
4 **HOLD switch (P. 23)**
Slide in the direction of the arrow to prevent the buttons from being accidentally pressed. Before using this Remote Commander, slide in the opposite direction of the arrow.

5 **START/STOP button (p. 17)**

6 **Power zoom button (p. 19)**

Attaching the Shoulder Strap

Attach the supplied shoulder strap to the hooks.



Specifications

Video camera recorder

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette
Tape speed	SP mode: Approx. 1.43 cm ($^{9}/_{16}$ inch)/sec. LP mode: Approx. 0.72 cm ($^{5}/_{16}$ inch)/sec. (playback only)
Recording time	SP mode: 2 hours (P6-120)
Playback time	SP mode: 2 hours (P6-120) LP mode: 4 hours (P6-120)
Fast-forward/rewind time	Approx. 6 min. 30 sec. (P6-120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 12 x power zoom lens f=6.0 to 72 mm ($^{1}/_{4}$ to $2^{7}/_{8}$ inches) Approx. 44 to 528 mm ($1^{3}/_{4}$ to $20^{7}/_{8}$ inches) converted into the focal length of a 35-mm still camera. F 1.8 to 2.8 with macro Filter diameter: 37 mm ($1^{1}/_{2}$ inches) TTL autofocus system inner focus wide macro system
Color temperature	Auto
Minimum illumination	2 lx
Illumination range	2 lx to 100,000 lx (0.2 to 9294 footcandles)
Recommended illumination	More than 100 lx (9 footcandles)
Aperture correction	Automatic With backlight adjustment

Input and output connectors

Video input/output	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio input/output	Phono jack Input: −7.5 dBs, input impedance more than 47 kilohms Output: −7.5 dBs, (at load impedance 47 kilohms) impedance less than 1 kilohms
RFU DC OUT	Special minijack, 5 V DC
Earphone jack	Minijack, 8-ohm impedance
Remote ⏻ jack	Stereo mini-minijack
MIC jack	Minijack, −66 dBs, low impedance with 2.5 to 3 V DC output, impedance 6.8 kilohms

General

Power requirements	On battery mounting surface 6.0 V (battery pack) 7.5 V (AC power adaptor)
Power consumption	5.5 W (camera recording) including the viewfinder
Installation	Vertically, horizontally
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to +140°F)
Dimensions	Approx. 118 × 108 × 267 mm (w/h/d) ($4^{3}/_{4}$ × $4^{3}/_{8}$ × $10^{5}/_{8}$ in.)
Mass	Approx. 845 g (1 lb 14 oz) excluding the battery pack, lithium battery, and cassette Approx. 1085 g (2 lb 6 oz) including the battery pack NP-55, lithium battery CR2025, and cassette P6-120
Microphone	Electret condenser microphone, omni directional, monaural type
Supplied accessories	See page 5.

AC power adaptor

Power requirements	110 – 240 V AC*, 50/60 Hz
Power consumption	15 W
Output voltage	DC OUT: 7.5 V, 1.2 A in operating mode Battery charge terminal: 10 V, 1.1 A in charge mode
Application	Sony battery pack NP-55, NP-55H, NP-66H, NP-77, NP-77H, NP-77HD
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to 60°C (−4°F to 140°F)
Dimensions	Approx. 103 × 49 × 63 mm (w/h/d) ($4^{1}/_{8}$ × $1^{15}/_{16}$ × $2^{1}/_{2}$ inches) including projecting parts and controls
Weight	Approx. 290 g (10 oz)

* Canadian Standard Association (CSA) certifies 120 V AC only.

Design and specifications are subject to change without notice.

Trouble Check

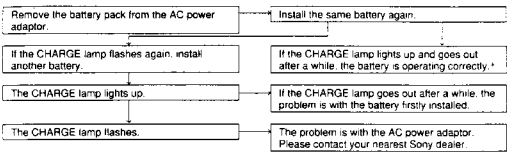
If you run into any problems using the camcorder, use the following table to troubleshoot the problem.

	Symptom	Cause	Corrective Actions	page
Power	The power does not go on.	The battery is not attached.	Attach the battery.	7, 25
		The battery is empty.	Use a charged battery.	6
		The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.	25
	The power goes off.	While being operated in CAMERA mode, the camcorder has been in the pause mode for more than 5 minutes.	Turn STANDBY down at once and turn it up again.	17
		The battery is empty.	Use a charged battery.	6
	The battery pack is quickly discharged.	The ambient temperature is too low.	—	8
		The battery pack has not been charged fully.	Charge the battery pack again.	6
		The battery pack is completely dead, and cannot be recharged.	Use another battery pack.	9
Operation	START/STOP does not operate.	The tape is stuck to the drum.	Eject the tape.	15
		The tape has run out.	Rewind the tape or use a new one.	18, 23
		The POWER switch is set to VTR.	Set it to CAMERA.	17
		The tab on the cassette is out (red).	Use a new tape or slide the red tab.	18
	The cassette cannot be removed from the compartment.	The battery is exhausted.	Use a charged battery or the AC power adaptor.	6, 25
	No function except for cassette ejection works.	Moisture condensation has occurred.	Remove the cassette and do not use the camcorder for at least an hour.	37
	The tape does not move when a tape transport button is pressed.	The POWER switch is set to CAMERA or OFF.	Set it to VTR.	23
		The tape has run out.	Rewind the tape or use a new one.	18, 23
	The autofocus function does not work.	Focus is set to MANUAL.	Set it to AUTO.	26
		Shooting conditions are not suitable for autofocus operation.	Set Focus to MANUAL to adjust the focus manually.	26

(Continued)

	Symptom	Cause	Corrective Actions	page
Picture/Sound	The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.	11
	A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high. The camcorder is not malfunctioning.	Change locations.	—
	The playback picture is not clear.	The EDIT switch is working.	Set EDIT in the opposite direction of the arrow.	34, 43
		The channel or input for the camcorder is not selected on the TV.	Select correctly.	22
		The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH cleaning cassette.	38
	When the TV is connected to the camcorder using the VIDEO/AUDIO jacks, the picture on the TV is not clear or moves vertically.	The IN-OUT selector is set to IN.	Set it to OUT.	22
Others	The supplied Remote Commander does not work.	The HOLD switch is working.	Set the switch in the direction opposite to the arrow.	23, 46
		The REMOTE COMMANDER switch is set to OFF.	Set it to ON.	24
		The batteries are not inserted with the correct polarity.	Insert the batteries with the correct polarity.	24
		The batteries are dead.	Insert new ones.	24
	There is dust inside the viewfinder.	—	Pull out the viewfinder and clean the viewfinder screen or viewfinder lens.	38

When the CHARGE lamp on the AC power adaptor flashes
Check through the following chart.


Remove the battery pack from the AC power adaptor.
Install the same battery again.
If the CHARGE lamp flashes again, install another battery.
If the CHARGE lamp lights up and goes out after a while, the battery is operating correctly.*
The CHARGE lamp lights up.
If the CHARGE lamp goes out after a while, the problem is with the battery firstly installed.
The CHARGE lamp flashes.
The problem is with the AC power adaptor. Please contact your nearest Sony dealer.

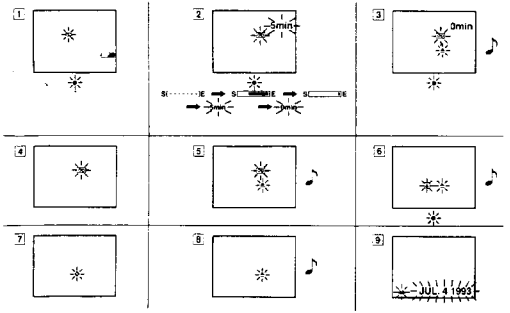
* If you use a battery pack which you have just brought or which has been left unused for a long time, the CHARGE lamp may flash at the first charging. But this is not a problem. Continue to charge with the same battery pack.

Note on the POWER lamp
The POWER lamp will remain lit for a while even if the unit unplugged after using. This is normal.

Indicators in the Viewfinder

Warning indicators

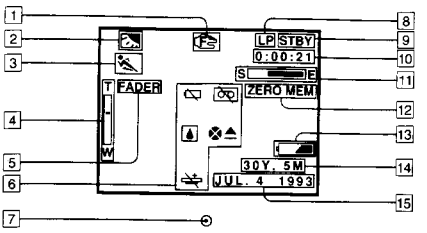
If indicators flash in the viewfinder, or a caution lamp on the camcorder flashes, check the following:



1. **Battery capacity remaining**
   Slow flashing: The battery is weak.
   Fast flashing: The battery is empty.
2. **The tape is near the end.**
3. **The tape has run out.** ♪
4. **No cassette has been inserted.**
5. **The tab on the cassette is out (red) (p. 18).** ♪
6. **Moisture condensation has occurred (p. 37).** ♪
7. **The video heads may be contaminated (p. 38).**
8. **Some other trouble has occurred.** ♪
   Disconnect the power source and contact your Sony dealer or local authorized facility.
9. **The lithium battery is weak or the lithium battery is not installed (p. 10).**

♪ means the camcorder beeps when BEEP is set to ON.

Identifying the indicators



1. **Manual focusing (p. 27)**
2. **BACK LIGHT indicator (p. 28)**
3. **PROGRAM AE mode indicator (p. 29)**
4. **Power zoom indicator (p. 19)**
5. **FADER indicator (p. 31)**
6. **Warning indicators (p. 37, 50)**
7. **Camera recording/caution lamp (p. 17, 50)**
8. **Lights up when playing back a tape recorded in LP mode (p. 23)**
9. **Tape transport mode (p. 11, 23)**
10. **Tape counter (p. 32)**
11. **Tape remaining indicator (p. 18)**
12. **ZERO MEM indicator (p. 32)**
13. **Battery capacity remaining indicator (p. 18)**
14. **Age indicator (p. 12)**
15. **Date or Time (p. 11)**